

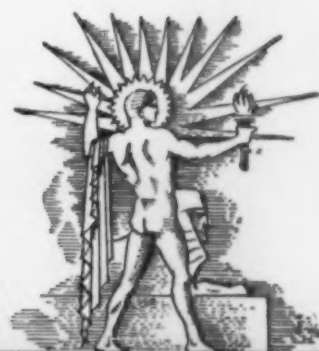
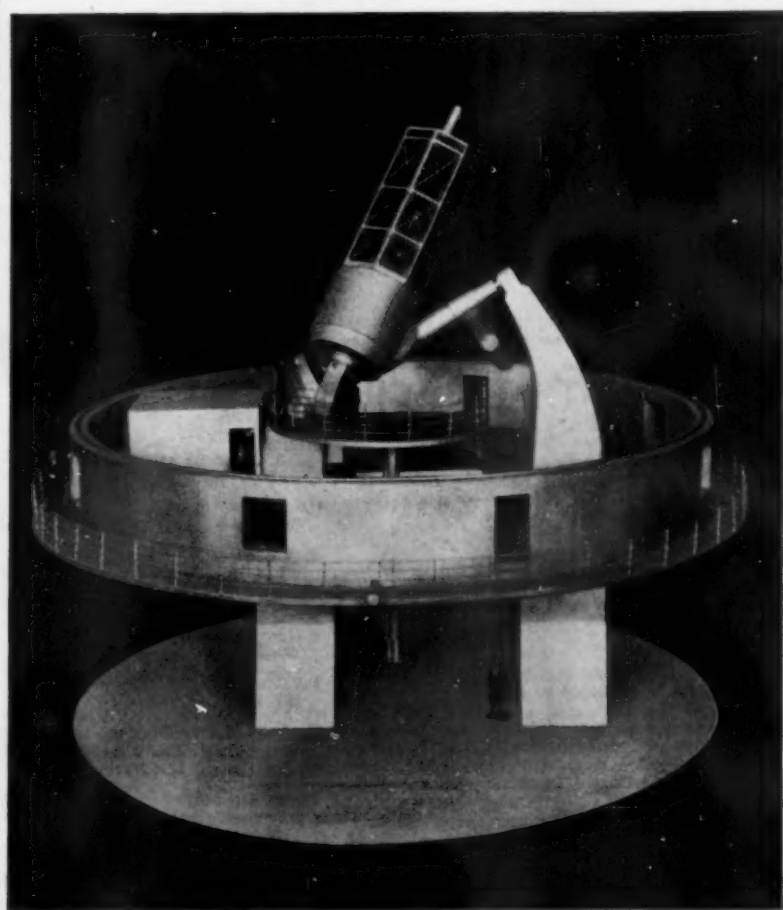
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



AUGUST 19, 1933

Texas Telescope

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DO YOU KNOW?

Needles of the longleaf pine sometimes grow 18 inches long.

Individuals differ so in keenness of smell and taste that some flowers seem fragrant to some people and odorless to others.

Copper can now be used in exposed places without tarnishing, as a result of fusing a thin, flexible silicate coating to the copper.

The banana tree is more properly called a herb, since it has no wood stem and the trunk is merely leaf stalks clustered together.

A 20 volume edition of the flora of the Soviet Union has been completed by Russian botanists, and it is said to contain over 20,000 species of plants.

The most beautiful photographs of trees in America are sought by the American Forestry Association for a collection to be exhibited throughout the country.

Chickens sometimes suffer from a disease which causes their wattles to swell.

Some of the sharks that lived millions of years ago were giants with jaws five feet wide.

Not all snails are slow: the ear shell snail of the Channel Islands can speed along at the rate of six yards a minute.

The number "pi", which children learn as 3.1416, has been carried out to hundreds of decimal places by calculators, one setting the record with 707 places.

Mountain plants are often dwarf, scrubby specimens, but in the Himalayas giant plants with bright colored blossoms are found at altitudes as high as 18,000 feet.

Going-to-the-Sun Highway, in Glacier National Park, has been opened to the public, thus providing a scenic route across the Rockies linking the east and west sides of the Park.

WITH THE SCIENCES THIS WEEK

AGRONOMY

Who caused farmers to stop raising "pretty" corn? p. 127. *Corn and Corn-growing*—H. A. Wallace and E. N. Bressman—Wallace Publishing Co., \$2.25.

ARCHAEOLOGY

What kind of feeding bottles did babies of the ancient Greeks use? p. 124.

When did iron come into common use? p. 117.

ASTRONOMY

How large is the mirror for the new Naval Observatory telescope? p. 120.

How was the period of rotation of Saturn determined? p. 115. *Astronomy for Everybody*—Simon Newcomb—Garden City, 1932, \$1.

In what three forms will it be possible to use the new McDonald Observatory telescope? p. 122.

What is the greatest temperature of the sun? p. 116.

Where is the second eclipse of 1933? p. 126.

BACTERIOLOGY

What is bacteriophage? p. 126.

BIOLOGY

How may albino frogs be produced? p. 117.

What is the size of the smallest known living things? p. 123.

ECONOMICS

What are two old examples of crop limitation? p. 122.

What farming lands may be abandoned in the resettling of America? p. 116. *The Pioneer Fringe*—Isaiah Bowman—American Geographical Society—1931, 361 p., \$4.

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Do rocks "attract" lightning? p. 120.

MEDICINE

Can cancer be treated with minerals in the blood? p. 121.

ORDNANCE

What is a "boat tail" bullet? p. 125.

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How are neutrons produced? p. 121.

What is ortho-hydrogen? p. 120.

PHYSIOLOGY

What part of a monkey's brain controls his tail? p. 120. *The Brain From Ape to Man*—Frederick Tilney—Hoeber, 1928, 2 vol., \$25.

Will animals live when their hemoglobin is outside the red blood cells? p. 122.

PLANT PHYSIOLOGY

What seeds failed to sprout in heavy water? p. 116.

PSYCHOLOGY

Are children afraid of traffic? p. 118.

PUBLIC HEALTH

How are selenium sprays most dangerous? p. 120.

How much did tuberculosis curtail average length of life in 1920? p. 124. *Procedures in Tuberculosis Control*—Benjamin Goldberg—F. A. Davis Co., 1933, \$4.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

ASTRONOMY

Spot Larger Than Earth Breaks Out On Saturn

Check of Rotation and Other Knowledge of Huge Planet May be Obtained by Study of 20,000-Mile-Long Blemish

A LARGE white spot, so immense that it could engulf an object over twice the diameter of the earth, has appeared suddenly on the equator of Saturn, the ringed planet and second largest of the solar system.

It was discovered by John E. Willis, U. S. Naval Observatory astronomer at 12:18 a. m. Saturday (Aug. 5) while he was observing a transit of Saturn as a routine operation, using the fixed six-inch telescope. Although he observed the planet for only about a minute before it left the field of view, Mr. Willis recognized the spot and called upon other astronomers at Uncle Sam's observatory to check his discovery. Principal Astronomer H. E. Burton turned the observatory's famous 26-inch telescope and a smaller 12-inch telescope upon the planet and confirmed the discovery. B. P. Sharpless also made confirming observations.

The spot was also noticed by a London music hall comedian and amateur astronomer, Will Hay, nearly 27 hours before it was found independently at the U. S. Naval Observatory. Mr. Hay, looking at the planet Thursday night (Aug. 5) through a six-inch refracting telescope at Norbury, saw the spot and notified Dr. W. H. Stevenson who confirmed the discovery.

German Reported First

A Berlin amateur astronomer, Dr. Weber, who is a professional physicist at the German Bureau of Standards, is reported as having seen Saturn's white spot about an hour before it was discovered by Will Hay in England.

Just what causes the white spot is unknown. Saturn is made of the lightest stuff of any planet, with a density one-eighth that of the earth or seven-tenths that of water. The planet must be very cold, perhaps as low as 290 degrees below zero, astronomers state. Most gases known to scientists on this earth would be very nearly condensed into liquids. The equator of Saturn, which is in line with the plane of its rings, is known to move faster in rotation than the other

parts of the planet. Perhaps the white spot is a gigantic whirl in Saturn's equatorial belt.

On Saturday morning it was estimated that the spot was about a tenth the diameter of the planet, but on Saturday night Principal Astronomer Burton with the 26-inch telescope found that the spot was much larger. While difficult to measure because not well defined, the spot seemed to be about 20,000 miles long and 12,000 miles wide, being formed by a sort of extension in the brighter equatorial belt of the planet.

To Last Several Weeks

It is expected that the spot will continue to be observable for several weeks. Astronomical records show that only twice before have such spots been observed on Saturn. The first was seen through the same 26-inch Naval Observatory lens in 1876 by the late Prof. Asaph Hall, Sr., just three years after the telescope was built. By using the spot as a mark of reference, Prof. Hall

was able to make the determination of the period of rotation of Saturn that is now quoted in astronomical tables, 10 hours, 14 minutes, 24 seconds. The 1876 Hall spot was not so large as the Willis spot now visible. Mr. Willis used the Hall determination of Saturn's period of rotation in predicting when the spot would return to visibility, and Saturday night's observations showed that the Willis spot is revolving around on the planet in about the expected time. The second spot on Saturn was discovered by the late Prof. E. E. Barnard of Yerkes Observatory in 1903. Unlike the Hall and Willis spots the Barnard spot was considerably north of Saturn's equator.

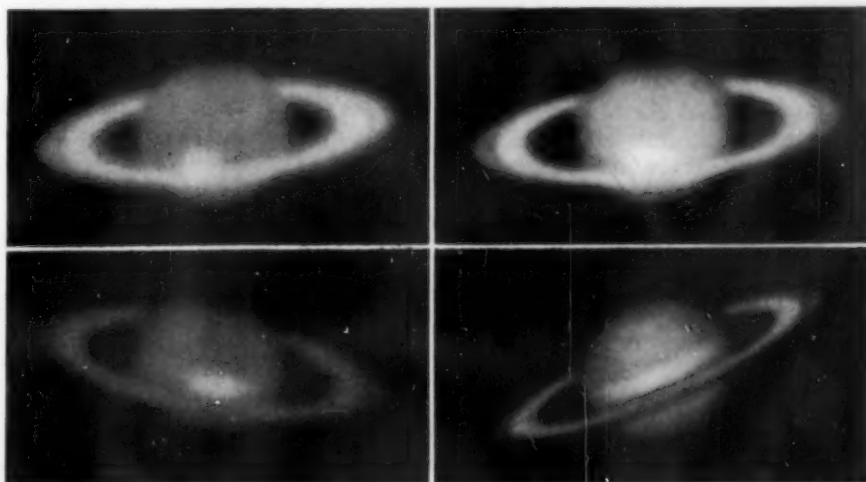
Spots Tell Rotation

The spots are useful in making measurements of Saturn's rotation, but Sir William Herschel made a close determination of the planet's period of rotation in 1794, without the aid of a spot. He came within 2 minutes of the value later determined by Prof. Hall.

Mr. Willis is hopeful that through observations of the spot with radiometers, spectroscopes, cameras and other instruments, it will be possible for astronomers to obtain added information about Saturn. Observatories located in the southern hemisphere are particularly well situated to study the spot.

Saturn is now a conspicuous object in the southern evening sky being outshone only by the moon and the star Sirius. (SNL, p. 70, July 29, '33)

Science News Letter, August 19, 1933



A STUDY IN SPOTS

Here are pictures of Saturn, taken under different conditions by two observatories. The two lower pictures are from the Lowell Observatory at Flagstaff, Ariz., while the upper photographs were made at the Lick Observatory of the University of California at Mt. Hamilton, Calif. The lower right picture, made by the late Dr. Lowell, Nov. 4, 1909, represents the equatorial belt of Saturn as it usually appears. In contrast is the lower left view showing the great white spot, taken by Dr. E. C. Slipher on Aug. 9. The upper left was photographed by violet light and the upper right by yellow light. Both were made by Dr. W. H. Wright on Aug. 6.

ECONOMICS

Moving to Better Lands Seen as Resettling of America

Continuation of Agricultural Reforms May Turn Marginal Areas Into Forests, Parks and Suburban Settlements

WE THINK of the settling of this continent as something belonging to the romantic past—of Pilgrims in New England and Quakers in Pennsylvania, of the Boones and the ancestors of Lincoln in the Kentucky forests, of the trains of covered wagons rolling evermore toward the setting sun. Those were days of settlement, truly, though they were also days of continuous un-settlement, as each generation in its turn arose to follow westward the constantly retreating but not-yet-spent lure of free land. The whole era of pioneer settlement in America was based on just that: individual self-sufficiency on free land, land of virgin fertility capable of yielding first a hard-won livelihood, and finally abundance, to the hardy and enterprising. We pass over without noticing the unfortunates and ill-adapted whom this tremendous rough plow turned under into oblivion.

But a new day is upon us, heralded by the tentative first efforts at a national agricultural economy being made this summer by Secretary of Agriculture Wallace and his associates. It is setting up a new social pattern for our farmers, of acknowledged interdependence instead of the old independence. When a man plants in grass a fourth of his former wheat acreage, and pastures cows on that grass, he is going to make stock-raisers seven states away feel the effects of that simple change. The planners of the new deal in agriculture have to take that into account.

They are doing so. In a recent address, Assistant Secretary of Agriculture Rexford Tugwell said, "In changing our pattern of basic crop production, we have set upon a process which is bound to alter our entire agricultural structure; and I think it may go beyond that and lead in time to a rational resettlement of America."

Especially was Dr. Tugwell concerned with the problem of the "marginal lands"—thin, rocky soils of the East, dry, alkaline lands of the West, poor, starved stretches of sand in the South

that yield half-starved livelihoods to the men who try to work them, while fat lands lie untilled or under-tilled because of the sweatshop competition of these pauper farms. Unless the New Deal in agriculture ends in frustration and failure, it will eventually have to work out a method by which these farmers can be induced to leave their unprofitable holdings and be settled on better lands, and also to decide the uses—forest, recreational areas, suburban settlements—to which the abandoned poor lands may be put.

In Russia, it is reported, such resettlement is being done sweepingly and more or less arbitrarily. America of the New Deal is not ready to readjust its life by compulsion, so long as persuasion to voluntary action is possible. But events sometimes have a way of supplying a compulsion all their own.

Science News Letter, August 19, 1933

PLANT PHYSIOLOGY

Heavy Water Prevents Seeds From Sprouting

THE NEW "heavy" water, one of science's latest discoveries, prevents the sprouting of seeds and may actually kill them, Prof. Gilbert N. Lewis of the University of California has discovered through the first biochemical experiments made with the double-weight hydrogen isotope.

Using minute tobacco seeds, Prof. Lewis put some of them in tiny test tubes that contained ordinary water. Others he put in tubes of the special heavy water containing only double-weight hydrogen. The seeds in ordinary water sprouted. Those in the new heavy water did not.

From theoretical considerations, Prof. Lewis predicted that water made with the heavy hydrogen would not support life and would be lethal to higher organisms. This was the first chance to test his theory. Prof. Lewis is now determining whether the seeds placed in

heavy water were merely inhibited or actually killed.

The heavy water used in these experiments has two atoms of hydrogen and one atom of oxygen, just as all water has. It is represented by the same familiar formula, H_2O . But all the hydrogen in the heavy water used by Prof. Lewis has its heart or nucleus twice as heavy as the common hydrogen nucleus, and so the weight of the rare water is increased due to this heavier constituent, known as hydrogen isotope of mass two.

Prof. Lewis has made a report to the *Journal of the American Chemical Society*.

Science News Letter, August 19, 1933

ASTRONOMY

New Determination Sets Greatest Solar Heat

ASTRONOMERS have made many guesses at the temperature of the interior of the sun from 10,000,000 degrees Centigrade up, but the limit is less than 100,000,000 degrees Centigrade (180,000,000 degrees on the common Fahrenheit scale) if new evidence on the disintegration of light elements is correct. Dr. Edwin McMillan of the University of California states in the *Physical Review*.

Astronomical evidence for this temperature is based on the heat necessary to balance the pressure of more than 9,000,000 tons to the square inch that exists at the center of the sun. Dr. McMillan has made his estimate from the relative amounts of lithium in the sun.

This terrific heat would be sufficient to transform the heavy lithium number seven into its lighter twin number six. Examination of pictures of the sun's spectrum taken by Dr. Arthur S. King of the Mount Wilson Observatory showed Dr. McMillan that the quantity of the light lithium in the sun is not much greater than on the earth.

A temperature of 180,000,000 degrees would jostle the cores of hydrogen atoms in the sun about with a speed equivalent to that given by an accelerating electrical field of 10,000 volts and this speed has been found to be sufficient to break down the heavy lithium in the laboratory. But since there is no excess light lithium on the sun it can not have this enormous temperature unless some unknown process keeps building up the heavy twin.

Science News Letter, August 19, 1933



ALBINOS FROM DYE BATH

Brought up from earliest tadpolehood in a dilute dye bath, these froglings lost all their small initial endowment of pigment and became albino frogs.

BIOLOGY

Frogs Reared In Dye Become Albinos

FROGS grown in permanent baths of dye do not become colored frogs. They become albinos, lacking color even in their eyes.

This paradoxical result was obtained in a long series of experiments with frog eggs and tadpoles by Dr. Margaret Reed Lewis of the department of embryology of the Carnegie Institution of Washington. Dr. Lewis used very dilute solutions of certain dyes, placing frog eggs and very young frog tadpoles in the various vessels.

The frog embryos that developed in the eggs were normally pigmented until they hatched, after which they lost all color, even from their eyes. The young tadpoles that were placed in the dye solutions after hatching similarly lost color, but did retain their eye pigments. Many of the young frogs showed other eye abnormalities in addition to the loss of eye color.

Dr. Lewis has made a detailed report of the experiments to the *Journal of Experimental Zoology*.

Science News Letter, August 19, 1933

ARCHAEOLOGY

Iron Blade Found Millenium Older Than Iron Age

Oriental Institute's Discovery in Mesopotamia Is Likened To Imagined Finding of Aluminum Saucepan in Dark Ages

STONE, bronze, iron has been the cultural sequence of the materials that archaeologists have found used for tools in the early ages. Iron is a relatively modern metal.

There is little wonder that a discovery made in the course of one of the many expeditions of the University of Chicago's Oriental Institute has created surprise among both archaeologists and metallurgists. For iron, worked by human hands and fashioned into a blade, iron that had not fallen heaven-sent as a meteorite, has been found at Tell Asmar in Mesopotamia among bronze objects that date from 2,700 B.C.

This is a thousand years earlier than iron has been known hitherto to have been used for tools and weapons, and it is some 1,400 years before iron came into common use in about 1,300 B.C.

It is as though an aluminum saucepan had been discovered in the Dark Ages.

In a Tell Asmar temple, dedicated to Ab-u, the Lord of Vegetation, the Oriental Institute's Iraq expedition directed by Dr. Henry Frankfort found a jar brimful of copper objects. There were bottles, lamps, strainers and daggers or meat-knives.

Every object, save one, was complete when it was recognized that the ages had decayed the bone knobs and wooden bodies of the knife-hilts. That one incomplete object was a dagger handle, in openwork technique, and it was without a blade. Dr. Frankfort reasoned that either a bladeless dagger was put into the jar, which was unlikely, or that the blade must have decayed. Only one metal, iron, can disappear almost completely. Yet this was centuries before iron was known to be used.

Prof. Cecil H. Desch, the eminent metallurgist of the National Physical Laboratories of England, was consulted. In the slot of the handle there was wedged a fragment of the original blade. Analysis showed it to be rusted iron, converted by long contact with the earth into a hard, magnetic, crystalline

mass. Without doubt the blade was of iron.

More important, the iron was not of meteoric origin. It contained no nickel as meteorites do and therefore it must have been won from the earth by some early iron-maker.

This fragment therefore becomes of first importance in the history of ancient metallurgy. In the Royal Tombs of Ur there was found a small axe of iron which Dr. Desch was able to show had been forged from a meteorite. Other iron objects of early date have also been proved by their high content of nickel to have been made from meteorites.

One of the first examples of worked iron known is the dagger sent by a Hittite king to Tutankhamen but this is a thousand years closer to the present than the iron knife just discovered.

Science News Letter, August 19, 1933

LINGUISTICS

Map Shows Sixty Dialects of Mexico

THE FIRST reliable language map to be made of Mexico, which will show where the nearly sixty indigenous tongues and dialects are now spoken in the country, is nearing completion. It is being prepared by Miguel Mendizabal, ethnologist of the Mexican National Museum. The data are from the general census taken in 1930, which was the first time in the history of Mexico that data on native races were scientifically gathered.

Comparison with a less accurate linguistic map made by Sr. Mendizabal from earlier and more incomplete data from the 1920 census nevertheless shows certain general facts. Indian racial movements are still taking place. For instance, Aztecs on the southern coast of Oaxaca have been largely replaced by Zapotecs in recent years, the reason not being one of racial superiority, but sudden Zapotecan profit in shrimp fishing.

Science News Letter, August 19, 1933

PSYCHOLOGY

Little Tragedies of Childhood

Scientists Make a Fascinating Journey Through the Child Mind by Studying Children's Dreams, Wishes and Fears

By MARJORIE VAN de WATER

"IF YOU HAD a wish, and your wish could come true, what would you wish?"

What is the answer to this familiar question of childhood? Dr. Arthur T. Jersild of the Child Development Institute of Teachers College, Columbia University, assisted by Miss Frances V. Markey and Mrs. Catherine L. Jersild, put this query to four hundred boys and girls. They took each one aside, privately, to ask it, and bent an attentive ear to the answer.

So now you may know what boys and girls aged from five to twelve years really want the very most.

Some are pathetically modest in their desires. One little boy wished for a leg or turkey—just a leg.

Others, the more intelligent ones, were surprisingly all-inclusive and expressed a wish for "money" or "ability."

One little boy revealed a secret tragedy in his heart when he stammered that he wished to be a girl, "because Mother'd rather I was a girl." He was the only boy who wanted to change his sex, although twenty-three girls wanted to be boys.

A revealing peep into the child's world of make-believe, his day dreams, is also given us by Dr. Jersild. Here is another of those intimate questions:

"When you are by yourself and imagine things, when you make-believe or pretend, or you are thinking and make up things to yourself—tell me what you imagine."

All the strange people and events of of night dreams, good and bad, were also made a matter of record. And the children's likes and dislikes, what they hope to do when they grow up, what they would do if they had a million dollars, the "worst thing that ever happened" to them, and the nicest thing, reasons for liking or disliking school, and the things that scare them.

You might think that the children who must navigate the crowded streets of New York on their way to school and play would be most afraid of dash-

ing automobiles, of being lost, of having to fight rough older boys.

But if so, you have a surprise in the answers of these youngsters. Here are the things they mention most often as what they are scared of:

"If a lion came and I had nothing." Alligators, gorillas, sharks, tigers, giraffes, bees and so on. And even more frequently than wild animals, children fear supernatural events including such matters as witches, ghosts, devils, spooks, skeletons.

Dreaded "Spooks"

Mystery movies and "spooky" movies or stories and those dealing with murders or gorillas are named very often.

But a surprising number mention deliberate attempts to frighten them.

"Mother puts a sheet over her head and comes at me." Or someone opens eyes big and makes clawing movements. Then too, "Cook says someone will take me," and "Mother says bogey would get me."

Of the four hundred, only three children said they were afraid of particular people or objects, only fifteen said they were scared of traffic accidents, and six of rough games and children, five of falling off high places.

Children's fears seem to be born chiefly of imagination or of the yarns told to them and seen by them in the movies. They have very little relation to the previous unpleasant experiences of the youngsters. This is shown by the "worst happenings" described by them.

Almost three-fourths of the children name physical injury, accident, or illness and narrow escape from these as the worst thing that ever happened to them. Pulled teeth are mentioned, and being dragged by a horse, broken bones, cuts, auto crashes, appendix operations, and falling.

But nary a lion or tiger. In fact only seven had ever been attacked by animals at all, or "almost" attacked by them. Eight mentioned severe beatings, whippings, or other corporal punishments. Only four youngsters were so impressed by school failure and bad reports.

Apparently children do not worry

much about unfortunate social situations that so embarrass their parents. Although many had felt the pinch of poverty very severely, very few mention fear of it or list ridicule, lack of proper clothing, hunger, or other such situations born of deprivation among either their fears or their worst happenings. Neither do they worry much about scoldings, or lack of ability. The children who wish for mental ability are those who already have more than the average.

What is the stuff that dreams are made of? Apparently, for children at least, they are built up from anything that may happen to the child in his waking hours. The common everyday occurrences are represented, and so also are his fancies, fears, and all those things he imagines.

Dreams told of by a great number of children were those picturing amusements, sports, games, and play.

"I was to a Christmas tree," they will say. Or, "I had party in the kitchen." "I went to circus," or "I was riding on a horse."

Movie characters and those of the comic strip of the newspaper people the dreams of a number of children.

"Peter Pan came in the window," one youngster dreamed. Others told of seeing Popeye, cowboys, Joe E. Brown, and Rip Van Winkle.

In dreams they view again movies of mystery and violence. The "Galloping Ghost" chases them, shooting and fighting is going on around them.

Many tell of dreams of the commonplace happenings of everyday life. "I'm getting up in the morning and getting dressed," "Mother was setting the table," and so on.

Fairies For Youngest

The youngest ones see fairies dancing, Santa Claus, snow men, Easter bunnies, and other delightful nursery folk.

And those comical incongruities that nearly every adult can remember as creeping into his dreams once in a while are also known to children. Here are a few samples.

"I saw a dogfish standing on his tail."

"I walked on my nose."

"Yellow pillow case was walking."

Children, too, are familiar with that common nightmare of feeling powerless, or unable to move.



IN DREAM WORLD

The mind of a sleeping child is filled with all the material of the child's waking life, including all the fantastic imaginings of the child.

"I couldn't run away when the red train came after me," one related.

"I'm on the track, train comes and I can't get away," another said.

No evidence was found for any particular theory of dreams. The theory is held by some psychologists that in dreams you fulfill your hidden wishes. Some of the dreams of children were of a character that would fit in with this idea—those which dealt with finding things, having possessions, having adventures and being heroic, and enjoying amusements and pleasures. But the total number of such dreams are a good deal less than half of those reported.

Bad dreams far outnumber good dreams in the descriptions given by the children, and the bad dreams, like the children's fears, are related more to fancied dangers and imaginary experiences than to any actual unpleasant events in the life of the youngsters.

When asked whether they have more unpleasant dreams than pleasant ones, however, the children say that the pleasant ones predominate. But still a great number of them insist that they do not want to dream any more.

It would seem that a bad dream is often so horrifying that many children would gladly forfeit any number of good dreams if they could be free from the whole business of dreaming.

Poor children seemed to have more dreams than did the children in better circumstances. This was due, it appeared, to the facts that the poor children attend exciting moving pictures more often and sleep in more disturbed, crowded, and noisy surroundings.

Poor children likewise are more beset with fears, perhaps also attributable to

the movies and to sensational yarns and deliberate attempts to scare them. For poor children are frequently at a show. Youngsters so pressed by actual hunger that they give as their one wish "a bowl of soup" also told of fears that were plainly based on movies they had seen. Wealthier children are not allowed to attend so often.

Children seem to carry around with them a great many more fears than they have any need for to protect them from the dangers of everyday life. But the fact that children have fears does not always mean that they are distressed by them.

Delightful "Terrors"

On the other hand, many youngsters get a real delight from their "terrors." Boys and girls who have been horrified by a melodramatic tale or picture would no doubt take the first chance offered to repeat the experience. Haven't you seen adults shriek with terror in the swift descent of a roller-coaster, but willingly hand over another dime for the thrill of a second trip?

Even little children in a nursery school will make up games in which they take turns scaring each other by playing "bogey man" or "lions" and "tigers." Each will shriek with terror when he is scared, but will keep right on with the game.

The poorer children differ from those better off financially in wishes also. Those from the poorer neighborhood wish for specific objects, while the wishes of the wealthier ones are more comprehensive. This seems to be due partly to a difference in intelligence and vocabulary—partly to the fact that the

one group is more up against the concrete realities of life.

A similar difference was found in the ways in which the two groups thought they would spend a million dollars. The richer children mentioned philanthropic ventures such as starting a hospital and "rebuilding the east side," much more often than did the poor ones. But when they were asked later what they would do if they should find a quarter on the way home, their answers showed that they saw no necessity for beginning the noble business on a small scale at once. It would seem that the uses for the hypothetical million dollars were largely lip service to the ideals learned in school and at home.

What would you do with a million dollars? Many of the children would save it or spend some and save the rest. Another large group would dispose of it by getting good things for the family—as one child said, "Dump it in Mother's lap." Only twenty-four out of the four hundred mentioned buying a good home, and four spoke of such improvements as "get a new stove," and "get good beds."

One child might have heard of the investigations of the millionaire bankers, for he answered, "I'd give it to a cop cause I'd get arrested."

Another optimist said, "If I had a million I'd buy the world."

Did you ever ask a child this question? "Tell me what you dislike more than anything else in the world, something you hate or don't like at all."

One out of every five will reply with the name of some food or taste, such as "spinach," or "castor oil" or "liver."

If he is a very bright child, he is more likely to indicate that he dislikes inactivity or having his own activities interrupted. He doesn't want to be bothered, and doesn't want to go to bed early.

Most of the others will mention individuals or groups of individuals. One child disliked, "Twins, they call you names and they are dumb." Cousins are mentioned and the "person who keeps on telling you the same thing all the time." And fresh people, bullies, snobs, stubborn teachers, and children who say "shut up."

Girls mention people and undesirable traits in people more than boys do. Boys on the other hand dislike unpleasant duties and disagreeable foods more.

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Science News Letter, August 19, 1933

GEOPHYSICS

Radioactivity of Rocks Affects Lightning Risk

NOT ONLY the height of a building or of a tree, but also the nature of the ground on which it rests, is of prime importance in determining whether it will be struck by lightning. That lightning chooses the path of least electrical resistance is the contention of L. N. Bogoiavlensky, Soviet scientist, in a letter to *Nature*. The resistance of the air, he explains, is influenced by the radioactivity of the rocks below it, since radioactive materials constantly give off radiation which increases the ionization and the conductivity of the air.

From the frequency with which the supports of an electrical power line have been damaged by thunderstorm, the Soviet geophysicist drew a graphic picture showing the parallelism between the number of lightning flashes that strike the ground, the electrical conductivity of the air, and the distribution of radioactive rocks below the surface of the ground. These rocks lie sometimes at considerable depths, more than 100 feet, but their radiation seems to be effective.

The measurements which led to these findings were carried out by the Radiological Department of the Central Chamber of Weights and Measures, Leningrad.

Science News Letter, August 19, 1933

PUBLIC HEALTH

Selenium Sprays Dangerous, U. S. Scientists Warn

KILLING insects with sprays containing the element selenium may have a dangerous aftermath for man, his livestock and his crops. Warning to investigate the poisonous possibilities of selenium sprays before using them is published in *Science* by three research workers of the U. S. Department of Agriculture, Dr. E. M. Nelson, Dr. Annie M. Hurd-Karrer and W. O. Robinson.

Selenium compounds that fall on the soil are absorbed by the plants, they state, and a particularly toxic compound is elaborated. Fifteen parts per million of selenium in the soil produces severe injury to the leaves of wheat plants, and a stunting of their growth. Quantities as small as one part per million do not prevent the plants from growing to maturity, but when grain or straw from such plants is fed to experimental ani-

mals it produces poisoning, retardation of growth, and finally death.

Selenium spray residues can be removed from fruits and vegetables by washing and the danger of direct poisoning to human beings thus eliminated. But the same plants can absorb the element from the parts of the spray that fall on the soil, and the kinds of poison they elaborate from it have no necessary relation to the poisonousness of the original spray material.

Furthermore, the three scientists add, there is evidence that selenium compounds may be reduced by soil organisms, so that spray residues ordinarily considered innocuous may be made available to the plant and be converted into highly toxic combinations.

Science News Letter, August 19, 1933

PHYSICS

Speed of Atom Hearts Too Great For Theory

CORES or hearts of the lightest chemical element, hydrogen, spin about on their axes at too great a rate. Drs. I. Esterman, R. Frisch and O. Stern of Hamburg University, Germany, have announced in a communication to *Nature* that ortho-hydrogen has a magnetic moment of 2.5 nuclear magnetons for each proton instead of one as demanded by the theory.

Nuclei, like electrons, are supposed to act as if they were attached to a minute gyroscope that spins at certain rates in such a way that the strengths of the magnetic fields due to spinning have certain integral values.

Since hydrogen is made of two atoms and each atom has its own spin, it is possible for the spins to either assist or oppose each other. One quarter of the molecules will possess no spin and three quarters will have twice the spin of an isolated hydrogen atom. The former variety of hydrogen is called para-hydrogen and the latter is called ortho-hydrogen.

By shooting hydrogen molecules, guided by their spinning hearts through an inhomogeneous external magnetic field and observing the deflection of the molecular beam, the German scientists were able to evaluate the strength of the gyroscopic action.

Elimination of the magnetic effect of the spinning of the whole molecule itself was accomplished by measuring the small deflection of the neutral para-hydrogen.

Science News Letter, August 19, 1933

IN SCIENCE

ASTRONOMY

New Naval Observatory Telescope Near Completion

IN AN AIR-conditioned room at the U. S. Naval Observatory in Washington, kept constantly at a temperature of 75 degrees while the rest of Washington swelters, Prof. George W. Ritchey is now bringing to completion his work on the 40-inch mirror for the Observatory's new telescope. In another month, he estimates, it will be finished. Already the mechanical parts of the telescope, including the mounting and the drive to enable it to follow the motion of a star across the sky, and the dome to cover it, have been completed.

The new telescope is a reflector, in which a concave mirror focusses the rays of star light, and is especially adapted to photography. The mirror is being ground to special curves, developed by Prof. Ritchey and Prof. Henri Chrétien, a French optician, which it is claimed will give it many advantages over the older forms of telescope. It is the largest telescope of this type that has yet been built.

Science News Letter, August 19, 1933

PHYSIOLOGY

"Tail Center" Found In Brains of Monkeys

MONKEYS' tails have a special brain center to control them. Its location has been discovered by Dr. John F. Fulton and Prof. J. G. Dusser de Barenne of the Yale University School of Medicine, who have reported their researches to the *Journal of Cellular and Comparative Physiology*.

The "tail center" occupies a position in the brain above and slightly in front of the centers that control the hind legs. If it is injured on one side, the tail develops a one-sided weakness, which however passes off in two or three weeks. If the injury is over the whole tail-control area, the tail is paralyzed, so far as voluntary use is concerned, though it is still capable of convulsive involuntary grasping.

Science News Letter, August 19, 1933

EE FIELDS

PALEOBOTANY

Illinois Ice Age Forests Like Those of Canada

FORESTS of spruce, fir, pine and larch, like those of present-day Canada, stood in central Illinois during a part of the great Pleistocene ice age. Evidence to this effect has been gathered by John Voss of Peoria, Ill., and is presented in the *Botanical Gazette*.

Mr. Voss gathered samples of buried logs, leaves and other plant remains from thick peat deposits of known ice age date in three widely separated localities. When his material was identified in the laboratory, it proved to represent trees like those of the present forests of the North.

Science News Letter, August 19, 1933

MEDICINE

Study Condemns Chemical Treatment of Cancer

CANCER treatment by adjusting the content of various minerals in the blood is not justified on the basis of present positive knowledge. This is the general conclusion which may be based on a study of the role of sodium, potassium, calcium and magnesium in cancer, made by Dr. M. J. Shear of the U. S. Public Health Service, working in the laboratories of the Harvard Medical School.

In his investigation, which included a review of the work done by many other scientists as well as his own researches, Dr. Shear failed to find any relationship between the cancerous process and the amount of the four elements in the blood serum. He did find that there is more potassium and less calcium in young, actively growing tumors than in slowly growing or old tumors; but he feels that the data are insufficient to justify any generalizations.

Sodium seems to have no effect on the growth of tumors, potassium may have a stimulating effect, calcium may have a retarding effect, while magnesium does not seem to have the inhibitory effect that has been claimed for it. But here again the amount of dependable data is

too small to justify basing medical treatment on any of these conclusions.

Dr. Shear does not consider the use of the gland extract parathormone, to increase the calcium concentration in the blood, as justified because of the lack of evidence of any benefit to be gained from calcium increase. Similarly, he does not recommend the use of magnesium as a supposed cancer deterrent. And while the chemical relations of sodium and potassium to cancer growth are somewhat better known, he feels that much more laboratory investigation should be made before any of the findings can safely be used as bases for clinical procedure.

Science News Letter, August 19, 1933

ASTRONOMY

Companion To Dog Star Tests Relativity Theory

RELATIVITY is on the witness stand again just because the companion star to Sirius, the brightest star in the sky, has been found to be only one third as bright as previously thought.

The trouble that arises from this dimness is explained by Dr. A. N. Vyssotsky, University of Virginia astronomer, in a communication to the *Astrophysical Journal*. The size of a star is known from its brightness so the companion star must be much smaller than heretofore assumed. Thus bodies on its surface weigh less than before. Scientists are interested in the force of gravity on heavenly bodies for it is this force that produces the Einstein "red shift," which means that light coming from this star has had its frequency of vibration increased or its color reddened by a minute amount. The heavier the star, the redder the light.

Values of this red shift obtained by Dr. Walter S. Adams at the Mount Wilson Observatory are greater than can be accounted for from Dr. Vyssotsky's observations. This discrepancy between theory and experiment will be checked by further observations on both the brightness and the reddening of the light.

This little star has caused trouble in the past, for astronomers had to assume that it was made of something about 400 times heavier than gold. This trouble is partially overcome by Prof. Vyssotsky's observations which indicate that it is about 60 times as heavy as the densest object on earth.

Science News Letter, August 19, 1933

PHYSICS

Fastest Particles Most Easily Stopped

THE FASTER they go the easier they are stopped.

This is what happens to the newly discovered building blocks of matter, neutrons, Dr. T. W. Bonner of the Rice Institute, reports in a letter to the *Physical Review*. Neutrons are particles having a unit mass on the scale of an atom of oxygen weighing 16. Their most peculiar property is that they have no electrical charge as contrasted to other fundamental particles, and it is this fact that prevented their discovery until a year ago by Drs. Irene Curie and F. Joliot in France and Dr. J. Chadwick in England.

Two and one half inches of lead are necessary to stop less than one half of these corpuscles that travel with speeds up to 20,000 miles per second.

Strangely enough, it is the fastest ones yet known that are the most easily stopped by the lead. Dr. Bonner thinks that if still faster neutrons are obtainable they might be more penetrating than the present fastest particles.

Neutrons are produced by the bombardment of light elements such as beryllium and boron with the cores of helium atoms thrown out by radioactive changes in polonium.

Science News Letter, August 19, 1933

FORESTRY

Nation's Forest Resources To be Surveyed

PART OF the \$15,982,745 just allotted to the U. S. Forest Service from federal public works funds will be used for research. It is planned to make a nation-wide survey of the country's forest resources, to be financed from this fund.

Research will also be aided indirectly through the improvement of the experimental forests, which are the field laboratories of the forest experiment stations, and the improvement of equipment in the Forest Products Laboratory of the Forest Service.

It is not yet known just how great a share of the allotment will be applied in these ways. The principal part of the fund, however, will go for construction work and the control of insects destructive to timber and the control of the white pine blister rust.

Science News Letter, August 19, 1933

PHYSIOLOGY

Artificial Blood in Dogs Shows Red Cells Guard Hemoglobin

THE RED CELLS of the blood in man and the domestic animals act as guardians of hemoglobin. Their chief function is to prevent the escape of this precious stuff on which the body depends for its supply of oxygen.

These are the conclusions reached by a group of scientific investigators at the University of Tennessee College of Medicine in Knoxville, Drs. William R. Amberson, Arthur G. Mulder, Fred-eric R. Steggerda, James Flexner and David S. Pankratz. A preliminary report of the research appears in *Science*.

In vertebrates, the class of animals to which belong man and other animals having a backbone, hemoglobin normally occurs only inside the red blood cells. But in some spineless or invertebrate animals, the oxygen-carrier is found in solution in the circulating blood. The general assumption was that in the vertebrates hemoglobin could not carry on its function of oxygen transportation when it got outside of the red cells of the blood.

The University of Tennessee research team has found that this is not the case.

Hemoglobin continues to carry oxygen to the tissues quite successfully when it is in solution instead of inside red blood cells. Dogs and cats lived and carried on normal activities, such as walking, running, seeing, and hearing when the blood in their veins and arteries was replaced by a synthetic blood mixture containing hemoglobin in solution instead of inside red blood cells. They showed no signs of lacking oxygen or of respiratory failure for a period of several hours after the synthetic blood mixture had replaced entirely their own blood.

However, the hemoglobin began to escape from the blood and was excreted from the body like waste products. When the supply had been exhausted, the animals died from oxygen lack and respiratory failure.

Such a disastrous escape of hemoglobin from the blood stream is prevented by the red cells, which hold the hemoglobin securely within membrane walls through which the hemoglobin cannot pass.

Science News Letter, August 19, 1933

ECONOMICS

Crop Limitation Saved Colonial Tobacco Planters

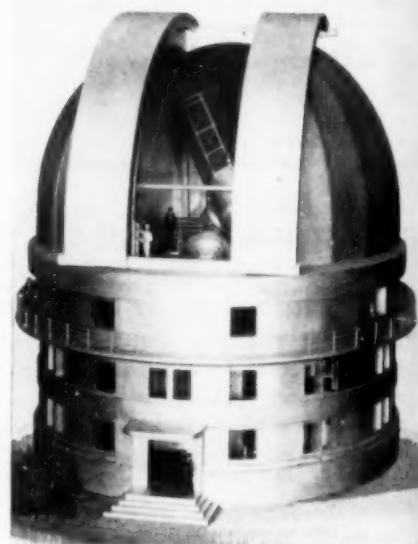
CROP LIMITATION is no new thing under the sun. In the pre-Revolutionary American colonies of Virginia and Maryland it once became necessary to save the tobacco planters from the consequences of the too-rapid expansion of their industry by establishing a maximum crop for each plantation.

The story of this early American crop limitation scheme was turned up by Dr. Rexford G. Tugwell, Assistant Secretary of Agriculture. In the early eighteenth century the over-production of tobacco in Virginia and Maryland, in the face of a market that expanded only slowly, was bringing hardship to the planters and to the entire community. So legislation was adopted aiming at an adjustment of supply to demand.

In that early day, said Dr. Tugwell, a man did not always know how much land he had, but he did know how many slaves he had; so each planter was restrained to setting out 6,000 tobacco plants for every Negro between 16 and 60 years of age on his plantation.

Another early example of crop limitation, this time in France, is cited by Dr. Tugwell from that Bible of individualistic economics, Adam Smith's "The Wealth of Nations." Early in the eighteenth century the grape growers, burdened with an over-production of grapes, obtained a government order prohibiting the planting of new vineyards and the renewal of old ones.

Science News Letter, August 19, 1933



FOR MOUNTAIN TOP

How the McDonald Observatory 80-inch telescope will appear when it is erected on a Texas mountain peak within the next few years. Model by Warner and Swasey Co. who are building the telescope. The telescope, as pictured on the cover, is shown here housed under its dome.

ASTRONOMY

Construction Begun On 80-Inch Texas Telescope

See Front Cover

THE GIANT 80-inch reflecting telescope that will spy upon the stars from McDonald Observatory to be erected on a peak of Davis Mountains, Texas, is now under construction.

A contract for the telescope has been approved by the University of Texas board of regents, and Warner and Swasey Company of Cleveland are the builders, it has been announced by Dr. Otto Struve, joint director of the Yerkes and McDonald Observatories.

Universities Cooperate

McDonald Observatory, with its 80-inch telescope which will be exceeded in size only by the present 100-inch Mt. Wilson reflector and the projected 200-inch California Institute of Technology telescope, is a joint undertaking of the University of Texas and the University of Chicago. With a bequest left by William J. McDonald, the University of Texas will erect and maintain the observatory, while the University of Chicago utilizing the experience of its Yerkes Observatory at Williams Bay, Wis., will staff and operate the new observatory.

A kind of glass that has a slightly smaller coefficient of expansion than pyrex glass will be used by the Corning Glass Works of Corning, N. Y., in casting the big 80-inch diameter mirror.

The mounting of the telescope will be of the cross-axis type, but the usual declination axis is replaced by a large bearing. Great adaptability is planned as the telescope will be capable of being used in the ordinary Newtonian form, in the Cassegrain form and in the Coudé form.

When operated in the Newtonian form, the image of the star or other heavenly object focused by the giant mirror is caught by a small mirror or prism and thrown to the side of the telescope tube near its top, where it is viewed through an eye piece. In the Cassegrain form, a small convex mirror placed at the focus reflects the rays back through the tube into a small hole in the big mirror and the observer looks directly at the stars as with a lens or refracting telescope. The Coudé arrangement uses a number of mirrors that bring the rays to a comfortable, fixed location where delicate apparatus may be used.

Constant Temperature

A constant temperature room will be provided at the lower end of the polar axis. The principal focal ratio will be 1 to 4, the focal ratio at the Cassegrain focus will be 1 to 15, and at the Coudé focus approximately 1 to 20.

The counter weight, which in other telescopes is attached to the declination axis, is moved in the McDonald telescope towards the upper end of the polar axis where it will not interfere with the hydraulic hoists operating the two platforms for the Cassegrain arrangement.

Mechanical details of the new telescope were worked out by E. P. Burrell, Warner and Swasey Co. director of engineering, while the specifications of the telescope were prepared by Drs. George Van Biesbroeck, Frank E. Ross, G. W. Moffitt and others of the Yerkes Observatory, with the advice of many other astronomers.

The photograph on the cover is a model of the McDonald Observatory 80-inch telescope with its novel elevator-like platforms. How the telescope fits in its housing and dome is shown by the picture on the preceding page.

Science News Letter, August 19, 1933

Elephants are very short-sighted.

BIOLOGY

Consider the Size Of The Smallest Living Things

Some, Not Seen Because Shorter Than Light Waves, Are Measured by the Size of Holes They Pass Through

WHILE PHYSICISTS are hounding their ultimate particles of matter down into dimensions so small that they hesitate any longer to call them particles at all but prefer to think of them as mere loci of energy, almost as mathematical points without real magnitude, biologists too have been busy trying to find out how small a thing can be and still be alive.

The biologists can never beat the physicists in a contest for champion diminutiveness, for to be alive at all an organism must have at least half-a-dozen elements stirred into its makeup, and as a rule quite a few atoms of each element. So the smallest possible living thing looms above the smallest possible particle of the physicist rather like a planet alongside a pea. Nevertheless, biologists are getting a lot of fun out of their chase—serious fun, to be sure, because the ultimate smallness possible to such a thing as a disease virus, that of smallpox, for instance, obviously has its practical significance in terms of human life and even cash values.

The Journal of Physical Chemistry recently published in tabular form the principal measurements of extremely small living things, or things that seem to be alive, as determined by a good many research workers. Most of these ultimate minima of living substance are either the invisible viruses of diseases or the equally invisible bacteriophages that are the diseases that kill bacteria themselves.

They have been measured by various more or less indirect means, but principally by the known sizes of the pores in filters through which these organisms (if they are organisms) can pass. The smallest of the bacteriophages in the list passed through a 20-millimicron hole, and the smallest of the virus particles through an opening half again as wide. From these minutenesses the living particles range up to 200 to 250 millimicrons, which is the size range of certain apparently living spheroids concerned in pleuro-pneumonia.

Now a millimicron, the ultra-microscopist's unit of measure, is a thousandth of a micron. A micron is a thousandth of a millimeter, and a millimeter is a twenty-fifth of an inch. One thousandth of one thousandth of one twenty-fifth of an inch figures out to one twenty-five-millionth of an inch; so these minutiae of life are obviously pretty small.

They will never be seen by ordinary visible light, because the shortest violet wavelength to which the human retina will respond is about 400 millimicrons long. The biggest of them, the 250-millimicron ones, are comfortably within the ultraviolet wavelength range, and so can be photographed with a special quartz-lens microscope set-up. But the littlest ones can be reached only by indirect means of measurement.

Yet these inaccessible invisible living things, some of them smaller than the known dimensions of non-living molecules, can get at us, and do get at us, with no difficulty at all. The viruses afflict us with such ills as chicken-pox and influenza, apparently; they give our livestock foot and mouth disease; they ruin our plant crops with leaf mosaics. The bacteriophages fight on our side, against all manner of microbes, from boils to the plague. So it will pay us to pursue our acquaintance with them, even if we never get to look squarely at them.

Science News Letter, August 19, 1933

GENERAL SCIENCE

Roosevelt Appoints Science Advisory Board

PRESIDENT ROOSEVELT has rallied a group of eminent scientists as a Science Advisory Board to aid the government in coping with scientific problems which the new era in American development will bring. The new board consists of men who have not only made reputations for themselves as leaders in their respective fields of re-

search but have also had long experience as executives in charge of the nation's foremost scientific organizations and institutions.

The President's executive order establishing the new board is as follows:

"The National Research Council was created at the request of President Wilson in 1916 and perpetuated by Executive Order No. 2859, signed by President Wilson on May 11, 1918. In order to carry out to the fullest extent the intent of the above Executive Order there is hereby created a Science Advisory Board with authority, acting through the machinery and under the jurisdiction of the National Academy of Sciences and the National Research Council, to appoint committees to deal with specific problems in the various departments.

Members of Board

"The Science Advisory Board of the National Research Council will consist of the following members who are hereby appointed for a period of two years: Karl T. Compton, Chairman, President, Massachusetts Institute of Technology, Cambridge, Massachusetts; W. W. Campbell, President, National Academy of Sciences, Washington, D. C.; Isaiah Bowman, Chairman, National Research Council, and Director, American Geographical Society, New York City; Gano Dunn, President, J. G. White Engineering Corporation, New York City; Frank B. Jewett, Vice-President, American Telephone and Telegraph Company, and President, Bell Telephone Laboratories, Incorporated, New York City; Charles F. Kettering, Vice-President, General Motors Corporation, and President, General Motors Research Corporation, Detroit, Michigan; C. K. Leith, Professor of Geology, University of Wisconsin, Madison, Wisconsin; John C. Merriam, President, Carnegie Institution of Washington, Washington, D. C.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, and Chairman of the Executive Council, California Institute of Technology, Pasadena, California."

Science News Letter, August 19, 1933

In 50 leading American cities cancer deaths have increased from approximately 71 to 122 per 100,000 population in about 20 years.

The freighter *Seirstad*, which hit an iceberg and sank May 18, landed on two transatlantic cables, putting them out of commission for four days.

PUBLIC HEALTH

Decade's White Plague War Adds Year to Average Life

ALMOST an entire year has been added to the general average duration of life by America's successful battle against tuberculosis within the decade from 1920 to 1930, statisticians of the Metropolitan Life Insurance Company of New York City have found. About another year's gain stands to the credit of the previous decade.

That so much has been accomplished in increased life expectation through attack on a single disease is considered to be "very remarkable and gratifying."

According to the mortality statistics of the recent census year, 1930, the curtailment of the average length of life due to tuberculosis was just over one year for white persons of either sex. In 1920 it was a little short of two years. Still another decade further back in time it was about three years.

The loss of potential years of life through a given cause depends not only on the degree of the mortality from that cause, but also on the age period at which its effect is concentrated. In this respect tuberculosis is in a particularly unfavorable position.

Deaths from tuberculosis occur very largely among young persons or persons at the prime of life. As the result of

this, although the death rate from tuberculosis has fortunately decreased in late years so far as to relegate this cause to the seventh rank among the principal causes of death, yet the number of years of life lost, on the average, is still a relatively important item.

Among white persons in the United States in 1930, the average length of life or the expectation of life at birth is shortened by 1.1 years through all forms of tuberculosis. Up to about the twentieth year of life the curtailment of the average remaining after-lifetime by tuberculosis remains nearly the same, irrespective of age, namely, about one year, according to the mortality as of 1930.

After this age it falls rapidly. Among white males, for example, the loss of remaining after-lifetime at age 42 is about one-half year, at age 62, only .15 of a year, or less than two months. The situation is strikingly different in the case of heart disease. There the loss of years of life was nearly the same for all ages up to 52, and only slightly less even at age 62, because heart disease claims most of its victims among persons in or past midlife.

Science News Letter, August 19, 1933

ARCHAEOLOGY

Greek Kids Got Spankings; Babies Had Rattles and Bottles

GREEK children got spanked with the classic equivalent for a slipper, and their infant brothers and sisters were amused with rattles and fed from nursing bottles.

These connections between child life in ancient and modern times were dug out of masses of Greek art material by Prof. Anita Klein and are described and pictured in a book recently published by the Columbia University Press.

A number of Greek paintings show children undergoing the painful application of a sandal-sole, and liking the process as little as a modern youngster would. Even the children of the gods

were not immune: one scene shows Cupid about to be "attended to" by his mother, Venus, while his father, Mars, looks on.

But when little Greek children were good, they did not go unrewarded. Prof. Klein's researches have brought to light astonishing numbers of toys used ages ago, as well as pictures of pets and records of childish amusements and games. The toys included play-carts and hoops exactly like those used by children today, as well as terra-cotta and bronze figures of dogs, horses, deer, cattle, lions, tortoises, mice, and domestic poultry. Older boys are shown

playing hockey, and one vase is decorated with a picture of two girls balancing on a see-saw.

Babies had feeding bottles made of pottery, though of course these could not be equipped with rubber nipples. These bottles were shaped rather like small teapots, with short side spouts, some of them smoothly rounded into nipple form. One of the bottles has a clay pellet inside, presumably so that the nurse could rattle it for the infant's amusement after it had been emptied.

Rattles for babies are usually hollow figures of terra cotta, with pellets inside. Prof. Klein remarks that these seem rather too fragile for a baby's own handling, and may possibly have been intended for the nurse to shake, attracting the child's attention.

Science News Letter, August 19, 1933

SURGERY

1,000,000 Operations In United States Every Year

OVER a million surgical operations a year are now performed in the United States, with few resulting deaths. This high figure was cited by Dr. George Crile, well-known surgeon of the Cleveland Clinic, in a report to the American Association for the Advancement of Science.

Telling what has been achieved in the past century and what lies ahead in the next, Dr. Crile said that one hundred years ago there were no surgical dressings. The X-ray was undiscovered. There was no skin grafting. Tonsils were not removed. Brain tumors were not disturbed. There were no operations to remove gall stones. Infection was not controlled. Working without anesthetics, the surgeon of a hundred years ago had to depend on a swift knife and hot iron, a steady hand and quick intuition.

"It was," said Dr. Crile, "the art of a swordsman rather than of a scientist."

Surgery has become more conservative and no longer does its chief work amputating limbs and cutting violently into human anatomy. Today, Dr. Crile said, every organ and tissue in the body is subjected to surgery, and the work is so delicately and precisely done that shock, hemorrhage, and infection are remarkably reduced.

A prediction that there will be fewer operations in the coming century was made by the surgeon, who said that biochemistry and biophysics will tend to supplant the surgeon's scalpel.

Science News Letter, August 19, 1933

ORDNANCE

"Boat Tail" Bullets Improved For Use in American Weapons

THE BULLET is foolish; the bayonet alone is wise.

This aphorism is credited to a Russian general of the Crimean War period. It may have had some truth in it then, for those were the days of the earliest large military use of rifled firearms—guns as clumsy and heavy as the old-fashioned smoothbore muskets they had barely replaced, which threw thumb-size slugs of lead rammed uncertainly down their throats on top of a handful of black powder that made so much smoke as to blind the soldier when he tried to aim his next shot. Certainly the general's point of view became that of Russian military men generally, for Russian troops even in these Soviet days still conduct all maneuvers with bayonets fixed.

But bullets have been learning a thing or two in the past hundred years; they aren't as bullet-headed as they used to be. In a recent article in *Mechanical Engineering*, Major Glenn P. Wilhelm of the Ordnance Department, U. S. Army, tells of the past century of progress in making bullets wiser.

One hundred years ago, he says, the standard military smoothbore musket could just be depended upon to hit a man at 100 yards. Today's military rifle can hit the same target just as easily at 1000 yards; and in the hands of a sharpshooter and with special ammunition and sights it will turn the trick at 1500 yards.

A century ago a soldier was doing

very good shooting if he could put ten consecutive shots inside a three-foot circle at 100 yards. Today's expert rifleman, shooting at that short range, puts all ten into a three-inch circle; and targets have been turned in that had all ten shots apparently through the same single hole.

One hundred years ago a musket could be fired once in two minutes. With the latest semi-automatic military rifle a soldier can deliver 100 aimed shots in the same two minutes.

The terrific increase in deadliness of fire is due largely to improvements in arms and ammunition, for although today's soldier has a better mechanical education he almost certainly is no stronger or quicker than his great-grandfather who "fit the Redskins" at Tippecanoe.

The latest thing in making American military bullets wiser is giving them what is called the "boat tail." This means tapering their rear ends to approximately the same shape as the stern of a boat, instead of leaving them flat and square across as heretofore. This lets the air close in around them as they slip through it; the old square base created a partial vacuum that pulled back on them and decreased their velocity and hence their flatness and accuracy of flight.

This trick, originally worked out by the French, was quickly adopted by the Germans during the World War when they found the advantage in range it was

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giving their enemies. The U. S. Army ordnance scientists have been experimenting for a long time to get a boat-tailed bullet suitable for American weapons, for the French ammunition, in spite of its virtues, had some offsetting faults. Now they have found what they were seeking, and the great stocks of rifle and machine-gun ammunition held in reserve against the possible war everybody hopes will never come will be loaded with the most highly educated bullets that have been evolved to date.

Science News Letter, August 19, 1933

To make quicker tests of how weather affects roofing and water proofing materials, engineers now use artificial rain, sunshine, cold and heat.

Three silver crowns studded with jewels were among the royal treasures recently found by archaeologists in Egypt when they explored a tomb of about 600 A. D.

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MILLIONTH OF A SECOND

an address by

Dr. J. W. Beams

Professor of Physics at the
University of Virginia

To be given Friday, August 25, at 1:45 p. m. Eastern Standard Time over stations of the Columbia Broadcasting system. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

BACTERIOLOGY

Bacteriophage Recruited For Fight Against Disease of Fish

SALMON and trout are to get their share of medical treatment according to recent bacteriological work. Dr. Charles Todd has reported in *Nature* the possibilities of wiping out the disease of furunculosis, an affection which yields skin ulcers and attacks the internal organs. This disease has caused a high mortality in salmon streams and it is proposed to eliminate it—at least in restricted waters—by means of a specific bacteriophage.

The bacteriophage is an element, specific in each case to some special strain of bacteria and which is deadly to that strain. Its nature is still in dispute. Whether it is a chemical product of the bacteria, or an animate form which preys on the germs, is debated. It is agreed, however, that the 'phage comes into evidence only after the bacterial "sponsor" has been at work. At any rate, it serves a highly practical purpose in actually killing off the strain with which it is allied.

Dr. Todd has isolated a bacteriophage which is very active against the germ (*B. salmonicida*) causing the salmon disease. This has been found in samples of several rivers throughout England. The strength of the 'phage is tested by applying it to cultures of the bacteria. Very soon the deadly element "eats holes" in the growth, and,

in large enough amounts, may annihilate the culture.

Healthy salmon are known to carry the disease, and therefore mortality is not a gauge for its occurrence. Dr. Todd suggests a test to measure the presence of the disease by examining the drain-water from a hatchery. If this water had been put in phage-free, any traces of the bacteriophage in the drain would indicate that the infection was present in some of the fish.

This work was performed at the National Institute for Medical Research.

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ASTRONOMY

Year's Second Eclipse Is Far Distant

THE SECOND eclipse of 1933 will be seen from points in Europe, Africa, Asia and Australia on August 21, when the moon passes between the earth and the sun, producing a solar eclipse. But unlike the much advertised eclipse of last August, this one is attracting practically no scientific attention. This is not because of its inaccessibility, because often astronomers travel halfway around the earth to observe one.

When the moon passes in front of the sun this time, it will be farther from the earth than usual, so that its apparent diameter will be a little smaller than that of the sun. As a result, a ring of sunlight will be seen around the dark disc of the moon, even where the eclipse is most complete. This is called an annular eclipse.

The path over which the ring of sunlight is seen, will begin at sunrise in the Sahara Desert, will pass eastward across Palestine, through Baghdad across Afghanistan, through Delhi, thence southeastwards through Burma, Borneo and North Australia, ending at sunset on the east coast of Queensland. The sun will be seen partially eclipsed over all of Asia and Australia, northeastern Africa and central and eastern Europe.

Science News Letter, August 19, 1933

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AGRONOMY



Pretty Corn

CURIOUS, how long farmers insisted on raising merely "pretty" corn, rather than corn that would give them the highest possible yield per acre.

For two or three whole generations after the first sod-breaking plow was stuck through the tough roots of the grass of ages on the upland prairies of Illinois and Iowa, farmers thought of corn in terms of the handsomest individual ear. In their county and state fair contests, they had the standard types gradually worked out and finally firmly established for them: so many inches long, so many in diameter, so much for depth of grain, so much for diameter of cob; grains neatly turned over butt, as neatly filling up the tip. An array of "points" as formidable as that faced by "bench" dogs or chickens—and as formal.

That these big, artistic-looking ears did not necessarily give the farmer most bushels for the labor and money he spent on each acre seems never to have occurred to him—certainly not to the corn judges at the fairs or to the seedsmen in the towns. The big ear, not the big yield, was what counted.

Then there came upon the scene a young farm paper editor, son and grandson of other editors of the same paper. He had been to college, had heard of the basic discoveries of the Austrian monk-scientist Mendel, of the experiments of the Danish plant breeder, Johannsen, of the pioneer work of the American geneticist Shull. He took up certain experiments in corn breeding where Shull had laid them down, crossing and re-crossing scores of the most unpromising-looking "pure lines" of corn, with only

one thing in mind: more bushels to the acre, not prettier ears at the fair.

Finally he succeeded. His "Hibred" strains of corn proved themselves time after time able to out-yield the best of the "handsome" corns by from four to ten bushels to the acre. His critics were silenced, the farmers increasingly convinced. They began to plant his corn.

Now by a strange ironical twist of fate that same young editor, Henry A. Wallace, sits as Secretary of Agriculture in President Roosevelt's cabinet. And one of his most stressing problems is to find out what to do with too much corn!

Yet no man with even elementary sense would advocate sending the farmer back to the old low yield per acre. It may be necessary for a time to administer economic artificial respiration to agriculture; but it would be idiotic while doing so to bleed the patient at the same time.

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• First Glances at New Books

Botany

THE FRESH-WATER ALGAE OF THE UNITED STATES—Gilbert M. Smith—*McGraw-Hill*, 716 p., \$6. Teaching botanists, as well as research botanists specializing in fields other than phycology, have long felt the need of a single, complete, convenient yet authoritative volume on the fresh-water algae. Prof. Smith now fills that need most admirably. His discussions are compact and to the point, and give all the information which the botanist will ordinarily need. Determinations are carried as far as the genus, which is enough for usual purposes; illustrations are simple and clear. The book automatically becomes a necessity for reference shelves of college and university botanical laboratories.

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Ornithology

HISTORY AND PRESENT STATUS OF THE BREEDING COLONIES OF THE WHITE PELICAN—Ben H. Thompson—*U. S. National Park Service*, 82 p., 2 maps. A detailed examination of the recent history, present status, and probable prospects of one of the most picturesque, albeit one of the most argued-about, of our native birds. This publication constitutes No. 1 of a new series: Occasional Papers of the Wild Life Division of the U. S. National Park Service.

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ENGINEERING

British Dry-Dock Could Handle 100,000 Ton Vessel

BRTAIN now has a gigantic dry-dock, claimed to be the world's largest, capable of accommodating a vessel of 100,000 tons if such a ship should ever be built. It is located at Southampton and holds 260,000 tons of water. The huge concrete structure is 1,200 feet long, 135 feet wide and 59 feet from cope to floor.

The extension of Southampton docks, begun in 1924 and just completed, ranks as one of the great civil engineering feats in recent times. The large dry-dock is just one of the features of this development. Dredging of 20,000,000 tons of mud, gravel, sand and clay from the harbor, the reclamation of 400 acres of land, and the building of a massive quay wall over a mile and a third long were features of the development.

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See Also
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Child Care

HOW TO CARE FOR THE BABY—Violet Kelway Libby—*Plymouth Press*, 110 p., \$1. A convenient and helpful manual for the use of the new mother in everyday care of the healthy, happy, sun-bathed, and cod-liver-oil fed 1933 infant.

Science News Letter, August 19, 1933

Health Education

A SUGGESTED TEACHING UNIT FOR SECONDARY SCHOOLS ON TUBERCULOSIS AND ITS PREVENTION—Jean V. Latimer—*Massachusetts Tuberculosis League*, 27 p., 20c. Designed to give school children "an attitude of objective curiosity" about tuberculosis so that if symptoms of the disease appear in themselves or members of their families, prompt steps will be taken toward early and accurate diagnosis. The pamphlet should be helpful to teachers in attaining this object.

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Entomology

RESULTATS SCIENTIFIQUES DU VOYAGE AUX INDES ORIENTALES NEERLANDAISES—V. Van Straelen—*Mus. R. d'Hist. Nat. de Belgique*, vol. IV, fascicules 4, 5, 6 and 7. These monographs describe coleoptera, hymenoptera, lepidoptera and diptera collected by the expedition.

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•First Glances at New Books

Additional Reviews
On Page 127

Physics

THE UNIVERSE OF LIGHT—Sir William Bragg—*Macmillan*, 279 p., \$3.50. Sir William, master physicist and popularizer, takes as the thread of his story that old rivalry between two theories of light which has been one of the most powerful contributors to the development of science. The book can be recommended without hesitation for reading by layman and physicist alike. The chapter headings are: The Nature of Light, the Eye and Vision, Colour, The Origins of Colour, The Colours of the Sky, The Polarization of Light, Light From the Sun and Stars, The Röntgen Rays, The Wave and the Corpuscle.

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Psychology

THE MIND OF THE CHILD—Charles Baudouin, trans. from Fr. by Eden and Cedar Paul—*Dodd, Mead*, 282 p., \$3. Child psychology from the point of view of the psychoanalyst. In his "Hints to Educators," the author says: "According to the findings of psychoanalysts, a child of seven has already gone beyond the age when its affective life is plastic, for the decisive shocks come before the sixth and even before the fourth year. A child of tender age should never be handed over to the care of second-rate persons. Psychoanalysis emphasizes the fact that a very young child's psychical development is already well advanced and extremely complex, so that education is of primary importance from the outset."

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Zoology

BIOLOGY OF THE PROTOZOA—Gary N. Calkins—*Lea and Febiger*, 607 p., 2 colored plates, \$7.50. A second edition of one of the most successful of books about protozoa.

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Mysticism

THE LIVING UNIVERSE—Sir Francis Younghusband—*Dutton*, 252 p., \$3. Mysticism hung upon the peg of science. The blurb recites:

"Astronomers say that the Universe is running down and that eventually light and heat, which are now being radiated, will be exhausted and the Universe will become stone dead and icy cold. But Sir Francis Younghusband, mystic and traveler in the Far East, does not share this gloomy view. By a new

and mystic interpretation of the principles of Evolution, he shows that, on the contrary, the Universe is an ever living organism, which is impelled upward by a great Cosmic Mind towards the foundation of the Kingdom of God on earth."

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Botany

WILD FLOWERS ROUND THE YEAR—Hilda M. Coley—*Gerald Howe, Ltd.*, London, 220 p., 5 s. A well gotten up book on English wild flowers, nicely illustrated by the author. It will be of interest to readers in the United States and Canada partly because many of the genera, and even of the species, are ours as well, partly as showing the original forms of some of our cultivated flowers, and finally because many of the flowers are old familiar friends by name in the classics of English literature.

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Technology-Economics

THE GREAT GOD WASTE—John Hodgson—*John Hodgson, Eggington, Beds., England*, 127 p. A species of technocracy from a British viewpoint. Mr. Hodgson discusses communal waste, the emergent order and the melting pot, often with fantastic touches.

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Psychiatry

PSYCHOANALYSIS AND MEDICINE: A STUDY OF THE WISH TO FALL ILL—Karin Stephen—*Macmillan*, 238 p., \$2.50. The Freudian theory and methods are here presented simply and clearly for the benefit of medical and other scientists who are not familiar with the methods and aims of psychoanalysis.

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Geology

HISTORICAL GEOLOGY—Raymond C. Moore—*McGraw-Hill*, 673 p., \$4. Into a field already well occupied by good textbooks in geology, this new text can come with good expectations of winning a good place, for it is excellently conceived, straightforwardly written and abundantly and excellently illustrated.

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Psychology

THE APE AND THE CHILD—W. N. Kellogg and L. A. Kellogg—*McGraw-Hill*, 341 p., \$3. A report of the authors' novel experiment in "humanizing" the ape. The book is a detailed report of scientific tests and the constant observation of an infant ape which lived and played as companion with the Kelloggs' young son who was almost the same age.

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Education

THE EDUCATIONAL TALKING PICTURE—Frederick L. Devereux—*University of Chicago Press*, 222 p., \$2. Through the participation of the University of Chicago in a twenty-part series of educational talking pictures of university level, the use of talkies has been introduced seriously to the educational world. The head of the producing company in collaboration with educational authorities, analyzes in this comprehensive book the problems, technique and results of educational talking pictures.

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Technology

PETROLEUM CODE HANDBOOK, 1933—Leonard M. Fanning, editor and publisher, \$5. Facts and figures of the petroleum industry for 1932 are included in this publication together with a considerable amount of commercial and technical information and buyer's guide data.

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Nutrition

ROWLAND'S DIABETIC COOK BOOK—compiled by John Rowland—*Omro Herald Print*, 110 p., \$2.50. This book cannot be recommended, since it claims to tell the diabetic how and what to eat so that he can get along without insulin. This is a procedure which should be undertaken only under the direction of the patient's physician. In fact, diets and menus for the diabetic, with or without insulin, should be prescribed in each case by the physician who is familiar with the patient's condition, according to modern medical opinion.

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